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(71) Applicant *(for all designated States except US)*: INTERACTIVE TELEVISION SYSTEMS, INC. [US/US]; Suite 800, 10800 Biscayne Boulevard, Miami, FL 33161 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: RHOADES, Donald, E. [US/US]; 233 Poinciana Island, Miami, FL 33160 (US). SPAULDING, John [US/US]; 948 Dogwood Drive, Delray Beach, FL 33480 (US).

(74) Agents: LIPTON, Robert, S. et al.; Lipton & Stapler, P.O. Box 934, 201 North Jackson Street, Media, PA 19063 (US).

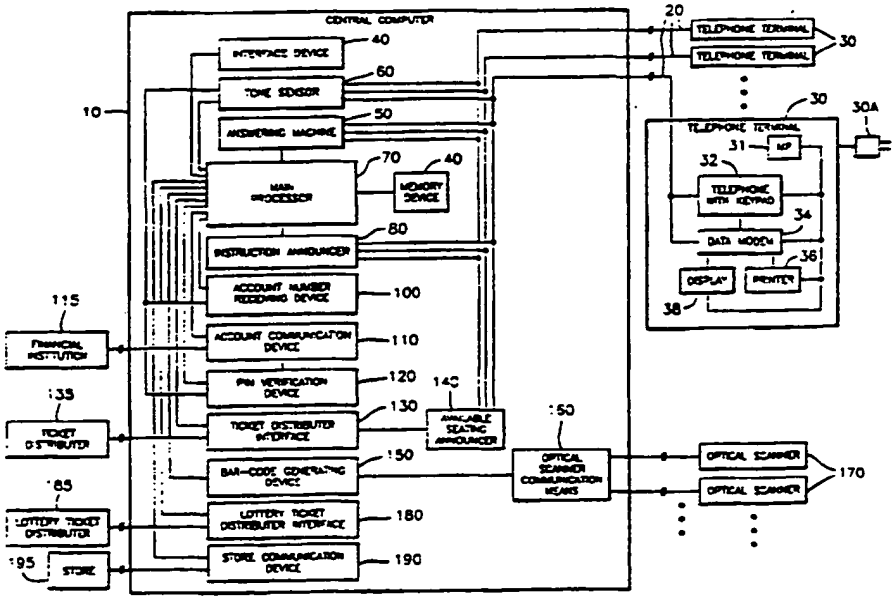
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(54) Title: TELEPHONE SYSTEM FOR REMOTELY PURCHASING TICKETS AND ORDERING PRODUCTS

(57) Abstract

A telephone system having at least one remotely located telephone terminal (30) for purchasing and printing lottery tickets as well as tickets to sporting events, airline flights, and concerts, and for buying products from a store and printing receipts therefor and printing coupons. The telephone system includes a central computer linked by telephone lines to the remotely located telephone terminals. The central computer (10) and each remotely located telephone terminal (30) can be located any place where telephone service is available; however, the remotely located telephone terminals are preferably placed in the homes or offices of subscribers to the telephone system. Each telephone terminal comprises a telephone with a TOUCH-TONE keypad (32), a data modem (34), a printer for printing ticket indicia (36), and a display (38). The display and printer are connected and responsive to the data modem. The central computer (10) comprises an interface device (40), an answering machine (50), a tone sensor (60), a main processor (70), and an instruction announcer (80). The interface device is connected to the telephone lines and is capable of establishing a communications link with the data modem of each telephone terminal. Preferably, the central computer (10) further includes a device for communicating with a financial institution (115), a ticket distributer (135), a lottery ticket distributer (185), a store (195), and optical scanners (170). In addition, the central computer preferably includes a bar-code generating device which causes a bar-code to be printed on each ticket for verification purposes, and optical scanners (170) for reading the bar-code at a location where the tickets are tendered.



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TELEPHONE SYSTEM FOR REMOTELY PURCHASING TICKETS AND ORDERING PRODUCTS

Technical Field

The present invention relates to a telephone system having at least one remotely located telephone terminal for purchasing and printing lottery tickets and tickets to sporting events, airline flights, concerts, etc. and for buying products from a store and printing receipts therefor.

As society moves deeper into the electronic age, it becomes evident that the traditional methods used to purchase products and services is wasteful, time consuming, and inefficient. If one wishes, for example, to purchase a lottery ticket, one must go to a lottery ticket outlet such as a liquor store, or convenience store. In doing so, much time is wasted, as well as energy if one travels by car. The same is true in the case of airline tickets, tickets to sporting events, and concert tickets unless one wants to wait for the tickets to arrive by mail.

U.S. Patents Nos. 3,688,276 to Quinn; 4,677,553 to Roberts et al.; 4,815,741 to Small; 5,083,272 to Walker et al.; 4,937,853 to Brule et al.; 4,908,770 to Breault et al.; and 4,922,522 to Scanlon are examples of conventional ticket vending devices.

The '276 patent to Quinn discloses a central computer which controls remote vending machines through long distance communication lines wherein the vending machines, in response to instructions from the computer, print and issue documents such as entertainment tickets, lottery tickets, race tickets and the like. According to this device, however, money must be give to the vending machine, or alternatively, an attendant must be present during a ticket purchase transaction. Furthermore, there is little security against ticket forgery, since the ticket printing device of Quinn prints directly onto valuable ticket stock material. The Quinn device also requires an expensive split platen printer mechanism capable of printing thick ticket stock on one platen and inquiry information on the other platen.

The '553 patent to Roberts et al. discloses a device for associating a bar-code with an instant lottery ticket. Here, however, confidential information is securely placed on tickets distributed in blank by a complex process of opaquely overlaying an area of the ticket upon which the information is to be placed in visible form and employing a printing apparatus that prints the visible information on the ticket area through the opaque overlay without leaving any easily-discernible trace in the overlay that reveals the imprinted information.

The '741 patent to Small discloses an apparatus and method for automated marketing and gaming wherein a player inserts an identification card into an automated remote interface device and accesses an account at a subject financial institution. The user identifier provides access to the financial account, and a user indicia is compared to a game indicia to determine whether a selected winning correlation is present between the game indicia and the user indicia. Although the primary purpose of the device is to promote use of an automatic teller machine or point of sale machine, the patent does mention use of the device to sell lottery chances. In particular, chances are purchased using funds from a financial account, while records of the purchase are maintained by the apparatus. This patent, however, fails to teach use of a printing device to remotely print different lottery or other kinds of tickets.

The '272 patent to Walker et al. discloses an interactive transaction system wherein a user interacts with the system by means of a telephone which delivers output signals from the user and receives input signals from the system. The telephone is interfaced to a communication network through a switching unit. An account is provided from which the amount of the transaction is debited. A transaction microprocessor is interfaced to receive the input signals from the telephone which identify the transaction, the amount of the transaction and the user's personal identification code. The transaction

microprocessor then communicates with the account microprocessor to authorize and complete the transaction. Although the patent mentions using the disclosed system for purchasing lottery chances, there is no means for printing tickets resulting from such purchases. Moreover, the patented device fails to provide a device for purchasing and printing other types of tickets, as well.

The '853 patent to Brule et al. discloses a bar-coding system for validating instant lottery tickets. The instant lottery tickets, however, are not remotely generated with the bar-codes at the time of purchase, but are instead purchased in the conventional manner with the bar-code already printed thereon.

The '770 patent to Breault et al. discloses a mail management system comprising a host system coupled to one or more operator workstations, which system can be used to print tickets. This system, however, suggests nothing more than its use with a conventional ticket dispensing machine such as those found in stores or tickets distribution centers.

The '522 patent to Scanlon discloses a system for providing telecommunications access to a lottery system. Although the system does provide the ability to purchase lottery tickets via telecommunications, there are no means provided for printing a forgery-proof lottery ticket at a remote location.

Disclosure of the Invention

It is therefore a primary object of the present invention to overcome the aforementioned problems and disadvantages, by providing a telephone system for purchasing tickets, and for printing the tickets thus purchased immediately at a telephone terminal in the home.

Another object of the present invention is to provide a telephone system for ordering products from one's home and for printing a receipt immediately at the home using a telephone terminal device.

In order to achieve these and other objects, the telephone system of the present invention comprises a central computer linked by telephone lines to at least one remotely located telephone terminal. The central computer and each remotely located telephone terminal can be located any place where telephone service is available; however, the remotely located telephone terminals are preferably placed in the homes or offices of subscribers to the telephone system. By arranging the telephone system in this manner, subscribers are able to access the telephone system conveniently from their home or office.

Each telephone terminal comprises a microprocessor, a telephone with a TOUCH-TONE keypad, a data modem, a printer for printing ticket indicia, and a display. The display and printer are connected and responsive to the data modem and the microprocessor.

The central computer comprises an interface device; an answering machine, a tone sensor, a main processor, and an instruction announcer. The interface device is connected to the telephone lines and is capable of establishing a communications link with the data modem of each telephone terminal. Preferably, all components in the central computer are redundant so that if a failure occurs, the central computer can automatically sense the failure, and automatically reconfigure the telephone system to eliminate the faulty component.

The answering machine of the central computer is also connected to the telephone lines and is responsive to incoming telephone calls, so that the incoming telephone calls are answered with a pre-recorded message explaining to the subscriber which buttons on the keypad of the telephone terminal correspond to ticket and product purchase transactions the subscriber can make with the central computer.

The tone sensor, which is also connected to the telephone lines and is responsive to tones generated by the telephone terminal, detects which keys are pressed on the keypad of the telephone

terminal in response to the explanation given by the answering machine. The tone sensor then outputs a signal to the main processor indicative of which keys were pressed.

The main processor of the central computer is connected and responsive to the tone sensor and is thus able to respond to keys pressed on the keypad of the telephone terminal. Based on the keys pressed and a predetermined protocol, the main processor processes a ticket purchase transaction and outputs ticket purchase data to the printer and the display via the interface device, the telephone lines, and the data modem. In the event that a product is ordered rather than a ticket, the main processor processes the product purchase transaction and outputs product purchase data to the printer. The printer then prints a receipt of the transaction.

The instruction announcer of the central computer is connected to the main processor. In particular, the main processor controls the instruction announcer such that one of a plurality of predetermined instructions is played. The particular instruction which is played corresponds to one step in a ticket or product purchase transaction. This instruction is announced to the subscriber via the telephone of the telephone terminal.

Preferably, the central computer further comprises a memory device for storing data related to each ticket or product purchase transaction occurring between the subscriber and the central computer. This information can be used for, among other things, billing purposes.

In addition, the central computer preferably comprises an account number receiving device connected to the tone sensor, for receiving at least one financial account number from the subscriber through the telephone terminal, and an account communications device for communicating automatically with a computer system of at least one financial institution. This arrangement allows financial account information pertaining to a financial account of the subscriber to be

accessed by the central computer. Preferably, the account communications device is capable of crediting or debiting the subscriber's financial account in accordance with ticket or product purchase transactions so that the mailing of a payment can be avoided.

For security reasons, the central computer can further comprise a PIN verification device connected and responsive to the tone sensor and also connected and responsive to the account communications device. In particular, the PIN verification device receives a personal identification number from the subscriber via the telephone terminal, and verifies the personal identification number based on financial account information. The PIN verification device is further connected to the main processor so that the main processor can deny or grant ticket and product purchase transactions based on verification of the personal identification number.

For added security, the main processor can be programmed to receive an authorization number from the subscriber through the telephone terminal, to verify the authorization number, and to grant or deny ticket and product purchase transactions based on whether the authorization number is valid. The authorization number in this case need not relate to a financial account.

Similarly, the microprocessor of the telephone terminal can be programmed such that, upon communicating with the central computer, the microprocessor performs an internal diagnostic check and transmits its model number, a revision number (corresponding to its most recent programming), and an indication of the outcome of the diagnostic check to the central computer.

In the event that the operator of the telephone system is not the initial seller of tickets, the computer system further comprises a ticket distributor interface for communicating automatically with a computer system of at least one ticket distributor. Using the ticket distributer interface, the central computer is given access to information pertaining to scheduling and available seating for airline

flights, sporting events, and concerts. In addition, the central computer further comprises an available seating announcer connected and responsive to the ticket distributer interface, for automatically announcing via the telephone terminal the information pertaining to scheduling and available seating. This information can likewise be displayed on the display of the telephone terminal.

In order to prevent mistakes in a ticket order, the main processor can be made responsive to confirmation information keyed in by the subscriber using the telephone terminal. In particular, the confirmation information would be indicative of whether the subscriber wishes to purchase tickets for the event and seat being currently announced by the available seating announcer.

Once a ticket order is placed and confirmed, the main processor and microprocessor cause the printer to generate a ticket having indicia indicative of the artist performing, seat number, place of performance, and date and time of performance in the case of a concert; the teams playing, date and time of the event, and the stadium in the case of a sporting event; and the airline, the date, time and place of departure, and the destination in the case of a flight.

In order to prevent the use of fraudulent tickets, the central computer can further comprise a bar-code generating device and a means for communicating with at least one optical scanner. Each optical scanner is positioned at a location where tickets from the telephone system are tendered. In operation, the bar-code generating device generates a bar-code which is printed on each ticket purchased using the telephone system and which is readable by each optical scanner. The means for communicating with the optical scanner then provides the optical scanner with information indicative of which bar-codes are valid so that the optical scanner can distinguish authentic bar-codes from fraudulent ones. Using this arrangement, fraudulent tickets can be detected at the point where they are tendered.

If the operator of the telephone system is not an initial

seller of lottery tickets, the central computer of the present invention can further comprise a lottery ticket distributer interface for communicating automatically with a computer system of at least one lottery ticket distributer so that lottery tickets can be purchased using the telephone system. According to such an embodiment, the information keyed in by the subscriber includes desired lottery numbers, types of lottery tickets, and number of tickets. This information is then received by the main processor via the tone sensor. In response, the main processor causes the information to be displayed on the display of the telephone terminal prior to completing the ticket purchase transaction. Preferably, the ticket purchase transaction cannot be completed by the main processor until the subscriber enters a confirmation via the keypad of the telephone terminal.

In the event that the operator of the telephone system is not the initial seller of products which can be ordered via the telephone system, the central computer further comprises a store communication device for communicating with the automated product ordering computer of a store. In particular, the main processor is programmed to receive via the keypad of the telephone terminal a product number corresponding to a particular product sold by the store. This product number can be obtained, for example, from a catalogue or advertisement which is provided to each subscriber. The display of the telephone terminal is preferably responsible to the main processor and microprocessor so as to display the product number for confirmation purposes. In this regard, the main processor can be programmed to complete a purchase transaction of the product only after having received a keyed-in confirmation from the subscriber. After the purchase transaction is complete, the printer of the telephone terminal can be used to print a receipt which, in turn, documents the order. The printer can also print a coupon to encourage further shopping.

According to a preferred embodiment of the present invention, the printer prints ticket indicia onto an adhesive-backed

material which can be subsequently attached to ticket stock material. Alternatively, since adhesive labels are typically more expensive than plain paper, and since the printer can be used to print both tickets and receipts, the printer can print the ticket indicia onto plain paper which is subsequently attached to adhesive ticket stock material.

It is understood that, until the particular stadium or other attraction, becomes equipped to handle tickets printed by the present invention, the printed tickets can be used as vouchers to redeem actual tickets at a "will call" window.

The above and other objects and advantages will become more readily apparent when reference is made to the following description taken in conjunction with the accompanying drawings.

Brief Description of the Drawings

Figure 1 is a block diagram illustrating a preferred embodiment of the telephone system of the present invention.

Figure 2 is a block diagram illustrating a preferred embodiment of a central computer in accordance with the present invention.

Figure 2A is a block diagram illustrating a preferred embodiment of a telephone terminal according to the present invention.

Figure 3 is a top view of a telephone terminal with a liquid crystal display.

Figure 4 is a top view of a telephone terminal with a liquid crystal display screen collapsed flat against the top of the telephone terminal.

Figure 5 is an elevation view of the telephone terminal of Figure 4 with the liquid crystal display screen arranged substantially perpendicular to the top of the telephone terminal.

Figure 6 is an elevation of a cable television interactive converter box in accordance with the present invention.

Detailed Description of the Invention And Best Mode for Carrying Out the Invention

With reference to Figure 1, a preferred embodiment of the telephone system of the present invention will now be described.

According to the preferred embodiment, the telephone system 2 comprises a central computer 10 linked by telephone lines 20 to at least one remotely located telephone terminal 30. The central computer 10 and each remotely located telephone terminal 30 can be located any place where telephone service is available; however, the remotely located telephone terminals 30 are preferably placed in the homes or offices of subscribers to the telephone system. By arranging the telephone system 2 in this manner, each subscriber is able to access the telephone system 2 conveniently from their home or office.

Each telephone terminal 30 comprises a PROM-based microprocessor 31, a telephone 32 with a TOUCH-TONE keypad, a data modem 34, a printer 36 for printing ticket indicia, and preferably a display 38. The telephone 32, data modem 34, and printer 36 and display 38 are all responsive to the microprocessor 31. Preferably, the PROM-based microprocessor 31 is electronically re-writable so that program software, account information and service provider phone numbers can be updated by a download sequence from the central computer 10. The display 38 and printer 36 are connected and responsive to the data modem 34 and the microprocessor 31.

Preferably, the display 38 is a liquid crystal display, however, as is mentioned hereinafter, the display can include other types of visual indicating devices. It is understood that a display 38 is not necessary and that in this regard, information can be received audibly through the telephone. The display 38 merely provides an easier overall arrangement which is less prone to human error.

The printer 36 preferably requires no outside maintenance, yet a very high level of print quality is achieved. To this end the printer 36 can comprise a thermal type printer where only new paper must be

periodically added, or a cartridge impact printer where paper, ribbon and a platen are changed at the same time thereby simplifying the maintenance procedures and insuring against poor print quality which might otherwise result from worn ribbons. In either case, the paper used by the printer has little value, per se, and only becomes valuable after being printed. The installation of new paper therefore does not require an employee of the service provider.

Regardless of which printer 36 is used, a warning light can be provided or message can be made to appear when the paper or cartridge needs to be replaced. In this regard, there can be two "Paper Out" levels, a first where a warning is provided at the telephone terminal device, and a second where the central computer is prevented from completing a transaction which would cause a ticket or receipt to be printed in the absence of paper.

The telephone terminal 30 receives electrical power from a modular power source 30A plugged into a conventional wall outlet. Different power modules can be supplied for various countries where the product will be used.

The central computer comprises an interface device 40; an answering machine 50, a tone sensor 60, a main processor 70, and an instruction announcer 80. The interface device 40 is connected to the telephone lines 20 and is capable of establishing a communications link with the data modem 34 of each telephone terminal 30. In particular, the interface device 40 can be realized using several commercially available communication devices. Rockwell, Figitsu, Motorola, and Dallas Semiconductor, by way of example, all manufacture modem chips which can work in conjunction with a complete telephone IC such as the Motorola MC34010/11A and accompanying microprocessor to achieve the interface device 40. Alternatively, the Zilog Z89C67 dual processor chip can be implemented as shown in Figure 2 and 2A, wherein the modem function is provided by part of the dual processor chip.

The answering machine 50 of the central computer 10 is also connected to the telephone lines 20 and is responsive to incoming telephone calls, so that the incoming telephone calls are answered with a pre-recorded message explaining to the subscriber which buttons on the keypad of the telephone terminal 30 correspond to ticket purchase transactions the subscriber can make with the central computer 10. In particular, the answering machine 50 can be realized using several commercially available answering machine ICs including those which are part of a modem, an example being the Dallas Semiconductor DS2244T telephone micro hybrid SIM. Alternatively, in the case of the Zilog Z89C67 dual processor chip illustrated in Figures 2 and 2A, control software contained in the Zilog Telephone Toolbox application software, performs the functions of the answering machine 50.

The tone sensor 60, which is also connected to the telephone lines 20 and is responsive to tones generated by the telephone terminal 30, detects which keys are pressed on the keypad of the telephone terminal 30 in response to the explanation given by the answering machine 50. The tone sensor 60 then outputs a signal to the main processor 70 indicative of which keys were pressed.

The tone sensor 60 itself can comprise any commercially available tone (Dual Tone Multi-Frequency - DTMF) detection circuit, which for example, can be found in modem chips manufactured by Rockwell, EXAR, and Dallas Semiconductor. Where the Zilog Z89C67 dual processor chip is used, the dual processor itself includes circuitry for detecting the tone being generated.

The main processor 70 of the central computer 10 is connected and responsive to the tone sensor 60 and is thus able to respond to keys pressed on the keypad of the telephone terminal 30. Based on the keys pressed and a predetermined protocol, the main processor 70 processes a ticket purchase transaction and outputs ticket purchase data to the printer 36 and the display 38 via the interface device 40, the telephone lines 20, and the data modem 34.

In the event that a product is ordered rather than a ticket, the main processor 70 processes the product purchase transaction and outputs product purchase data to the printer 36. The printer 36 then prints a receipt of the transaction. The printer 36 can also provide a coupon to thereby encourage further shopping.

According to the embodiment illustrated in Figures 2 and 2A, the main processor 70 comprises a combination of an integral Z8 microcontroller in the Zilog Z89C67 dual processor controller, and a service provider computer. The service provider computer in Figure 2 controls, inter alia, account verification, access of seating information for at least one Interactive Voice Response Service Module (IVR), and placing of orders. Although not illustrated in Figure 2, there can be more than one IVR service module, each of which acts as a peripheral device attached to the service provider computer.

The instruction announcer 80 of the central computer 10' is connected to the main processor 70. In particular, the main processor 70 controls the instruction announcer 80 such that one of a plurality of pre-determined instructions is played. The particular instruction which is played corresponds to one step in a ticket or product purchase transaction. This instruction is announced to the subscriber via the telephone 32 of the telephone terminal 30. In addition, the instruction announcer 80 can be arranged such that the instructions are displayed on the display 38 of the telephone terminal 30.

The instruction announcer 80 preferably is a speech or voice processor which converts digitally stored data into analog signals that can be heard by a subscriber. Such speech or voice processors are known and can be made from commercially available components. For example, a Dallas Semiconductor SIM device such as the DS2249 Data Access Arrangement (DAA) device which interfaces with a phone line, can be combined with a DS2244T Telephone microprocessor, and with a DS2271 speech processor to provide a complete IVR service

module having voice announcing capabilities.

In the exemplary embodiment of Figures 2 and 2A, the IVR service module inherently includes an instruction announcer and a memory which maintains voice menu instruction data. It should be noted, however, that in certain menu sequences, additional voice menu data is transferred to the IVR service module from the service provider computer.

Preferably, the central computer 10 further comprises a memory device 90 for storing data related to each ticket or product purchase transaction occurring between the subscriber and the central computer 10.

In addition, the central computer 10 preferably comprises an account number receiving device 100 connected to the tone sensor 60, for receiving at least one financial account number from the subscriber through the telephone terminal 30, and an account communications device 110 for communicating automatically with a computer system of at least one financial institution 115. This arrangement allows financial account information pertaining to a financial account of the subscriber to be accessed by the central computer 10. Preferably, the account communications device 110 is capable of crediting or debiting the subscriber's financial account in accordance with the ticket or product purchase transactions so that the mailing of a payment can be avoided.

According to the embodiment of Figures 2 and 2A, the service provider computer system includes accounting software which allows the service provider computer to act as an account number receiving device 100 and an account communications device 110. According to this embodiment, the accounting software verifies a subscriber's PIN (as is described hereinafter) and, in the case of a store purchase transaction, is responsible for transferring order information to stores , wherein the stores are responsible for charging the particular subscriber's credit card account. The service provider computer on a

periodic basis transfers orders along with customer data including credit card information, item information and shipping information. Detailed information is maintained within the service provider computer by the accounting software so that agreed-upon commissions can be collected with the sale of products. At predetermined intervals, the service provider bills the various stores for these commissions.

In the case of lottery ticket purchases using the embodiment of Figures 2 and 2A, the accounting software can be used to communicate with a participating financial institution, wherein money is deposited on account for the purpose of purchasing lottery or other gaming tickets. Whenever a ticket purchase transaction occurs, the subscriber's account is debited and funds are automatically transferred into the lottery system account, as well as the service provider account which receives a commission for the sale of the tickets.

For security reasons, the central computer 10 can further comprise a PIN verification device 120 connected and responsive to the tone sensor 60 and also connected and responsive to the account communications device 110. In particular, the PIN verification device 120 receives a personal identification number from the subscriber via the telephone terminal 30, and verifies the personal identification number based on financial account information. The PIN verification device 120 is further connected to the main processor 70 so that the main processor 70 can deny or grant ticket purchase transactions based on verification of the personal identification number.

In the Figures 2 and 2A embodiment, the accounting software allows the service provider computer to act as a PIN verification device. In particular, the IVR service module requests that the subscriber enter his/her PIN number via the keypad of the telephone terminal. The IVR service module then detects the DTMF tones generated as a result of the subscriber's entry, and then passes the resulting data to the service provider computer. The service

provider computer then verifies whether the PIN is valid.

For added security, the main processor 70 can be programmed to receive an authorization number from the subscriber through the telephone terminal 30, to verify the authorization number, and to grant or deny ticket purchase transactions based on whether the authorization number is valid. The authorization number in this case need not relate to a financial account.

Similarly, the microprocessor 31 of the telephone terminal 30 can be programmed such that, upon communicating with the central computer, the microprocessor 31 performs an internal diagnostic check and transmits its model number, a revision number (corresponding to its most recent programming), and an indication of the outcome of the diagnostic check to the central computer 10.

In the event that the operator of the telephone system 2 is not the initial seller of tickets, the computer system 10 further comprises a ticket distributer interface 130 for communicating automatically with a computer system of at least one ticket distributer 135. Using the ticket distributer interface 130, the central computer 10 is given access to information pertaining to scheduling and available seating for airline flights, sporting events, and concerts. In addition, the central computer 10 comprises an available seating announcer 140 connected and responsive to the ticket distributer interface 130, for automatically announcing via the telephone terminal 30 the information pertaining to scheduling and available seating.

In the Figures 2 and 2A embodiment, the service provider computer and the IVR system act as a ticket distributer interface and an available seating announcer, respectively. Information regarding available seating is provided by the ticket distributer to the service provider computer. The IVR service module, which is connected to the service provider computer, then transfers this information to the telephone terminal (or screen phone or interactive cable TV box, both of which are described hereinafter). The type of information sent is

determined by model number data sent to the central computer during the initial diagnostic check, and depends on whether the information is to be presented audibly to the subscriber, displayed on an LCD display or screen, or displayed on a television set. It is understood that all of the transmitted information need not be in the same format. For example, certain information might be displayed, while other information is transmitted audibly.

In order to prevent mistakes in a ticket order, the main processor 70 can be made responsive to confirmation information keyed in by the subscriber using the telephone terminal 30. In particular, the confirmation information would be indicative of whether the subscriber wishes to purchase tickets for the event and seat currently being announced by the available seating announcer 140.

Once a ticket order is placed and confirmed, the main processor 70 causes the printer 36 to generate a ticket having indicia indicative of the artist performing, seat number, place of performance, and date and time of performance in the case of a concert; the teams playing, date and time of the event, and the stadium in the case of a sporting event; and the airline, the date, time and place of departure, and the destination in the case of a flight.

In order to prevent the use of fraudulent tickets, the central computer 10 can further comprise a bar-code generating device 150 and a means 160 for communicating with a plurality of optical scanners 170. Each optical scanner 170 is positioned at a location where tickets from the telephone system 2 are tendered. For example, several optical scanners 170 might be located at an airport, several others at a theater, and still others at a stadium. In the case of lottery tickets, an optical scanner 170 might be located at a liquor store or convenience store that sells and redeems tickets for cash to non-subscribers of the telephone system 2, as well as subscribers. In operation, the bar-code generating device 150 generates a bar-code which is printed on each ticket purchased using the telephone system

2 and which is readable by each optical scanner 170. The means 160 for communicating with the optical scanner 170 then provides each optical scanner 170 with information indicative of which bar-codes are valid so that the optical scanner 170 can distinguish authentic bar-codes from fraudulent ones. Using this arrangement, fraudulent tickets can be detected at the point where they are tendered.

Because bar codes typically are treated as merely another font, the logic required to print them is already present in the printer's controller circuit board (not illustrated). Optical scanners 170 are known and include those which function as peripheral devices attachable to the serial or parallel I/O port of virtually any computer. In addition, because the optical scanners 170 are typically remotely located, they can be connected to the central computer by a long cable, or alternatively, can be connected using wireless communications. Examples of such wireless communication are LAN connections and serial connections such as Proxium spread spectrum communications.

If the operator of the telephone system 2 is not an initial seller of lottery tickets, the central computer 10 of the present invention can further comprise a lottery ticket distributer interface 180 for communicating automatically with a computer system of at least one lottery ticket distributer 185 so that lottery tickets can be purchased using the telephone system 2. According to such an embodiment, the information keyed in by the subscriber includes desired lottery numbers, types of lottery tickets, and number of tickets. This information is then received by the main processor 70 via the tone sensor 60. In response, the main processor 70 causes the information to be displayed on the display 38 of the telephone terminal 30 prior to completing the ticket purchase transaction. Preferably, the ticket purchase transaction cannot be completed by the main processor 70 until the subscriber enters a confirmation via the keypad of the telephone terminal 30.

The lottery ticket distributer interface 180 will likely vary from state to state. Currently, most states have their own lottery ticket printing terminals, each of which is linked to a central lottery computer. The communications between these terminals and the central lottery computer are established using high security data encrypted modem interfaces. According to the embodiment of Figures 2 and 2A, the service provider computer simply emulates a lottery printing terminal already in the particular state's lottery system. This includes the transmission of lottery selection number to the state's lottery computer system. Validation of lottery tickets can be performed by the state.

In the event that the operator of the telephone system 2 is not the initial seller of products which can be ordered via the telephone system 2, the central computer 10 further comprises a store communication device 190 for communicating with the automated product ordering computer of a store 195. In particular, the main processor 70 is programmed to receive via the keypad of the telephone terminal 30 a product number corresponding to a particular product sold by the store. This product number can be obtained, for example, from a catalogue or advertisement which is provided to each subscriber. The display 38 of the telephone terminal 30 is preferably responsive to the main processor 70 so as to display 38 the product number for confirmation purposes. In this regard, the main processor 70 can be programmed to complete a purchase transaction of the product only after having received a keyed-in confirmation from the subscriber. After the purchase transaction is complete, the printer 36 of the telephone terminal can be used to print a receipt which, in turn, documents the order.

According to the embodiment of Figures 2 and 2A, the service provider computer includes software which allows the service provider computer to function as a store communication device 190. Preferably, the service provider computer further includes product

information stored on disk, which product information is used to complete product purchase transactions. Transactions for the purchase of goods or services, are typically executed on a local level between the service provider computer and each telephone terminal. Whenever a sale is made, the information pertaining to that sale is maintained in the service provider computer, and on a periodic basis, the various store computers poll the various service provider computers so as to request transfer of any outstanding sales orders. Having received the order, the store verifies the credit card, ships the purchased product to the subscriber, and collects the money from the credit card company. Both the service provider and the store maintain records of all sales, and on a periodic basis, the service provider bills the store for commissions based on sales.

According to a preferred embodiment of the present invention, the printer 36 prints ticket indicia onto an adhesive-backed material which can be subsequently attached to ticket stock material. Alternatively, the printer 36 can print a voucher which is subsequently redeemed at a "will call" window, or which is later attached to an adhesive piece of ticket stock material. As a still further alternative, the printer 36 prints the indicia on a plastic material which is thereafter electrostatically fixed to ticket stock material. Such plastic materials are known, for example, in the art of photographic album manufacturing, where thin pages of plastic are electrostatically attached to thicker pages of paper stock material.

An exemplary operation of the telephone system 2 will now be described.

Initially, a subscriber of the telephone system 2 is provided with a telephone terminal 30 which simply plugs into any conventional phone jack (2 or 4 wire conventions) and is able to function as a conventional telephone. In addition, the subscriber is provided with an instruction manual which lists at least one service telephone number which, when dialed, will automatically connect the

telephone terminal 30 to a central computer 10. The manual also includes a listing of, and seating diagrams for, various airplanes, concert halls, and stadiums; a schedule of upcoming performances, sporting events, and flights each having a performance, event, or flight number associated therewith; a listing of stores which can be accessed by the system; and a listing of the various lottery games which can be played by way of the telephone system 2. In addition, the subscriber is also provided with catalogues from the stores which can be accessed. Each catalogue includes an item number for each product sold by the particular store. Both the catalogues and the manual can be updated on a regular basis, for example, monthly.

To use the system, the subscriber first calls one of the service numbers using the TOUCH-TONE keypad of the telephone terminal 30, or alternatively, where the microprocessor 31 is programmed for automatic dialing of pre-determined service numbers, the subscriber merely presses a single function key on the telephone terminal 30, which function key effects automatic dialing of a service number. The subscriber's call is then answered by the answering machine 50 of the central computer 10. The answering machine 50 directs the subscriber to enter an authorization number via the keypad of the telephone terminal 30. This authorization number is then verified and access to the system 2 is granted or denied based on the result of this verification. The answering machine 50 then directs the subscriber to press a particular key corresponding to the transaction he wishes to make. In particular, various possible transactions are recited in a menu-like manner and the subscriber merely has to choose one of the transactions.

After the subscriber makes their selection by pressing the appropriate key, the tone sensor 60 in the central computer 10 detects which key was pressed. This information is then transmitted to the main processor which, in turn, activates the instruction announcer 80.

The instruction announcer 80 responds by providing the

subscriber with additional information corresponding to the transaction selected, and then requests information from the subscriber, which information is entered via the keypad of the telephone terminal 30. The information requested by the instruction announcer 80 can include the number of tickets; the performance, event, or flight number, or the seating section desired depending on the transaction selected.

In the case of a concert or sporting event ticket, for example, the instruction announcer 80 might request a code corresponding to the performance schedule the subscriber is using. This code is then used to verify that the schedule is still valid. If the schedule is no longer valid, the instruction announcer 80 proceeds through a longer menu describing the performance schedule. However, assuming the schedule is still valid, the instruction announcer 80 requests the particular performance number associated with the desired performance. Additionally, the instruction announcer 80 requests information indicative of the desired seating section and number of tickets. If no seats are available in the desired seating section, several choices of the best seats for that particular performance in the same price range would be displayed on the display 38. Preferably, the microprocessor 31 is programmed such that these several choices which appear on the display 38, can be scrolled through using a predetermined set of keys on the keypad. Accordingly, the desired seating can be selected by scrolling to the particular seat. If none are satisfactory, the subscriber can then be directed to choose a different seating section. The same processes would then be repeated for the different section.

After each information request, the tone sensor 60 detects the subscribers response and transmits this information to the main processor 70. The main processor then processes the selected transaction, but prior to completing the transaction, causes the instruction announcer 80 to recite the results of the current transaction. In addition, the display 38 shows each response entered

by the subscriber as it is entered. The instruction announcer 80 then requests a confirmation from the subscriber indicating whether the current transaction is exactly what the subscriber wants. In particular, the confirmation is entered via the keypad of the telephone terminal 30.

Once the transaction is confirmed, the main processor 70 causes the instruction announcer 80 to request a financial account number from the subscriber. This account number can refer to a credit card account, or any other financial account which can be credited or debited for payment purposes, and can include the type of account (for example, "1" for VISA and "2" for MASTERCARD), expiration date, etc. Specifically, the financial account number is entered by the subscriber via the telephone terminal 30, and is received by the account number receiving device 120 which, in turn, provides this information to the main processor 70. The main processor 70 then activates the account communications device 110 which is linked to a financial institution holding the particular account.

Once the account communications device 110 is connected to the financial institution, financial account information pertaining to a financial account of the subscriber is accessed by the central computer 10. Preferably, the account communications device 110 not only detects the available funds, but also credits or debits the subscriber's account in accordance with the desired transaction.

However, before access is granted to the subscribers account, the subscriber is instructed to enter a personal identification number corresponding to the particular account being accessed. The PIN verification device 120 via the tone sensor 60 receives this personal identification number, and verifies the personal identification number based on financial account information received through the financial account communications device 110. Access to the financial account is thereafter granted or denied based on the validity of the personal identification number. Alternatively, the PIN number could be

a service provider PIN number, not directly related to any financial institution.

Once the transaction is completed by appropriately debiting the subscribers account, the main processor 70 activates the bar-code generating device 150 of the central computer 10. The bar-code generating device responds by generating a bar-code indicative of a validation number, which validation number can include the subscriber's personal identification number. The validation number or other information is then transmitted by the optical scanner communication means 160 to the optical scanners 170 at the location where the ticket is to be tendered. The optical scanners 170 read a bar code validation number and compare it to a number in a validation computer. Alternatively, a small wireless computer and scanner receives validation numbers prior to each performance. The optical scanner reads a bar coded number from a ticket and compares it to valid numbers.

Alternatively, validation computers can be provided at the event or location where the tickets are to be used. All the validation numbers for the particular event or location are maintained in the validation computers. In particular, the validation numbers are downloaded into the validation computers prior to the intended period of use. When a ticket holder surrenders his/her ticket, either to an attendant or to an automated ticket scanning device, an optical scanner 170 reads the bar-code on the ticket, compares the read bar-code against a list of valid numbers contained within the validation computer, and either accepts the ticket as valid if a match is found or rejects it if no match is found. If a ticket is accepted, the validation number corresponding thereto, is eliminated from the list of valid numbers.

Next, the printer 36 is activated to print ticket indicia on an adhesive label or plain paper or electrostatic plastic. The ticket indicia preferably include the generated bar-code and numerical

equivalent thereof, along with other information such as the artist performing, seat number, place of performance, and date and time of performance in the case of a concert; the teams playing, date and time of the event, and the stadium in the case of a sporting event; and the airline, the date, time and place of departure, and the destination in the case of a flight. After printing, assuming all the tickets are correct, the adhesive label is removed from the printer and fixed to ticket stock material previously provided to the subscriber. The subscriber then enters a second confirmation via the keypad of the telephone terminal 30, which confirmation actually finalizes the transaction.

If, however, any one of the tickets is printed erroneously, the subscriber must hit a key indicating that an error has occurred. The system will then display the last four digits of the bar-code numbers of all the tickets issued, and the subscriber is directed to scroll using the display 38 to the ticket number corresponding to the erroneous ticket, and to hit the # symbol once there. This process is repeated until all the erroneous tickets are accounted for.

The subscriber is next asked several questions and directed to identify the nature of the error by pressing a key on the keypad indicative of the error. After the subscriber responds, new tickets are printed and the bar-code number of each erroneous ticket is invalidated. If the problem persists the subscriber can cancel the entire transaction, and be connected to a customer service operator which will help them. After all tickets are printed correctly, the subscriber enters the second confirmation thereby finalizing the transaction.

Thereafter, when the tickets are tendered at a location having at least one of the optical scanner 170, the optical scanner 170 scans the bar-code on each ticket and determines whether the bar-code is valid. If valid, admission to the particular event or flight is permitted and the particular validation number represented by the bar-code is removed from the list of valid codes. The ticket is thus invalidated after its first use. If the bar-code is not valid, admission can be denied

thus preventing the use of fraudulent tickets.

In the case of lottery tickets, the ticket purchase transactions are effected in the same manner as the purchase of other tickets. Here, however, the instruction announcer 80 requests information pertaining to the number and type of tickets desired, and also pertaining to whether random number generation is to be used. When random number generation is not used, the instruction announcer 80 asks the subscriber to enter the desired lottery number. These lottery numbers are entered via the keypad of the telephone terminal 30. The display 38 then displays each number so that the subscriber receives a visual indication of which lottery numbers have been received by the main processor 70.

Thereafter, the subscriber is directed to press a key indicative of whether he wishes to confirm the entered lottery number. Only after receiving this confirmation is the lottery ticket purchase transaction completed.

It is noted that some states prohibit the use of credit card accounts to purchase lottery tickets. Therefore, in the case of lottery tickets, the main processor can be programmed to prevent such use of credit card accounts, and instead insist on a bank account number, or the like.

Once the transaction is completed, the printer 36 prints the resulting lottery tickets on either adhesive labels or on stock material. Each ticket preferably includes a bar-code as discussed above. In addition, the central computer preferably stores lottery purchase information so that winners can be readily identified.

When a product purchase transaction is desired rather than a ticket purchase transaction, the subscriber presses the key corresponding to product purchases, in response to the menu-like recitation of options by the answering machine 50. The tone sensor 60 in the central computer 10 is then activated to detect which key was pressed. This information is transmitted to the main processor

which, in turn, activates the instruction announcer 80. The instruction announcer 80 requests a store number indicative of the particular store where the desired product is sold. After this store number is keyed in by the subscriber, a product number is requested. The product number, which can be found in one of the catalogues provided to the subscriber, is then displayed on the display 38 for confirmation purposes. If a confirmation is received by the central computer 10 from the subscriber, the transaction is completed. As in the case of lottery and other ticket purchases, the subscriber can be asked for a financial account number and personal identification number. Here, however, after the transaction is completed, a receipt is printed by the printer 36 rather than a ticket. The receipt can include any information indicative of the completed transaction, such as the items ordered, total cost including shipping and handling, and the date each item is expected to be delivered. In addition, a coupon can be printed to encourage further shopping.

The communication links from the central computer 10 to the financial institution, the ticket distributer, the lottery ticket distributer and the store are preferably telephone lines; however, it is understood that any other type of communications link can be utilized.

In addition, a combination of audio communications and the display 38 of the telephone terminal 30 can be used to receive stock market quotes and bank balances to pay bills. In order to maintain accurate records, a receipt of each such inquiry can be obtained using the printer 36.

An embodiment of the present invention using a Zilog Z89C67 dual processor and Zilog's Telephone Toolbox Software will now be described with reference to Figures 2 and 2A.

The dual processor includes a conventional Z8 microprocessor used for primary control, and an advanced DSP (Digital Signal Processor) used for high performance analog signal processing. The service provider computer can be realized using a modified IVR

computer system available from any one of a plurality of companies such as Apex Voice Communications, Applied Voice Technology, ATD systems, and AT&T Conversant Voice Systems.

The IVR service module illustrated in the exemplary circuit of Figure 2 is designed using the Zilog Z89C67 dual processor, with an external Z8 control ram, an external audio ram, and a CODEC phone interface module. The CODEC phone interface module is designed with a hybrid front end which includes a transformer for isolation, a 2 or 4 wire phone line converter, an off-hook relay switch, as well as a noise cancellation circuit. Preferably, the service provider computer system uses multiple IVR service modules to accommodate multiple simultaneous users. Depending on the size of the overall system, multiple service provider CPU's may be networked together. The service provider computers are connected via modems to the various stores, ticket distributors and financial institutions. The IVR service modules are connected to the telephone network using individual phone lines connected through a rotary hunt group function at the telephone company's central office. This way, the subscriber merely calls the service provider number, and the rotary hunt group service places the call with any available IVR service module.

When the call is placed to an IVR service module, the ring current is sensed by the digital signal processor via the CODEC, and causes an off-hook condition to occur. The Z8 controller software then begins an interactive voice response process by retrieving the appropriate digital voice data from memory, and then passes this data through the DSP where the DSP software prepares the message for transfer via the CODEC which translates the digital data back to an analog signal that the subscriber's telephone terminal will receive as an audio instruction to press a particular key on the terminal's keypad. The pressing of the key will result in the generation of 1 of 16 unique Dual Tone Multi-Frequency (DTMF) signals. The IVR service module senses the DTMF tone sent by the subscriber's telephone terminal in

response to the preceding message. As a function of the DTMF tone received, another message specific to that tone is retrieved from memory. This process continues through the various menus with an announcement responded to by a DTMF tone, and a tone responded to by an announcement until the subscriber is to a point where the IVR service module transfers data via a MODEM or DTMF codes to the telephone terminal.

The present invention could use either DTMF or MODEM technology, with each DTMF tone representing a nibble (4 bits) of data. The modem function is faster, and typically implements error correction/detection functionality making it the preferred method.

It is important to note that, according to this embodiment, the telephone system sends both voice messages and digital data across the same phone line during the same data exchange session. By contrast, commercial off-the-shelf IVR systems would require some degree of modification. By using a combination controller such as the Z89C67, there is a seamless interface between the digital (Z8) and the analog (DSP) technologies.

The digital data sent to the subscriber's telephone terminal is used to either display data on the LCD, or to drive the printer. Valid data transferred in either direction uses a synchronizing burst of 1's and 0's to mark the beginning of valid data. In particular, multiple 1's followed by a zero to mark the beginning of valid data is a common synchronizing technique. A special code that precedes the data going to the telephone terminal determines the data's destination as either the printer or the LCD display. Other codes sent to the printer specify form control, font style and the type of bar-code to be printed.

Whenever data is sent to the telephone terminal, a filter within the DSP function senses that the signals being received are digital data and not voice. The microcontroller uses this information to enable the data circuits and to mute the voice circuits. To this end, there is transmitted, immediately ahead of a data transmission, a burst

of a signal at a frequency and duration which is different from those that generally characterize voice transmissions. For example, this may be a sustained burst of 2,800 Hz for 250 milliseconds. The mute function of the DSP at the printer phone terminal (Fig. 2A) is programmed to detect this burst, functioning as a synthetic filter for its frequency. In response, the Z8 commands the sound received through the telephone to be muted. The end of a data transmission is conventionally accompanied by a code which so indicates and this is used to reactivate the telephone, in preparation for voice reception.

Without such muting during data transmissions, the subscriber would hear not only the voice, but also the data signals. Since these have no meaning for the human ear, they would constitute a serious annoyance to the subscriber and would also be a source of confusion, since the subscriber would not be sure whether to pay attention to them or not.

Furthermore, by quickly switching between voice and data in the manner described above, both can be used to provide the highest degree of flexibility with the interactive voice/data menu function.

Whenever a product or service choice is made, the key information related to that decision is presented in the LCD display with a star cursor marking the active cell. If the subscriber agrees with the choice, the subscriber will be prompted to generate a combination of DTMF tones such as those produced by depressing the * and # keys. If the subscriber disagrees with the information presented on the LCD display, a different key or key combination can be used. If the subscriber presses the keys indicating agreement with the selection, the display on the subscriber's telephone terminal is cleared, and the subscriber's choice will be echoed back as the only entry on the LCD display. The subscriber will then be given another opportunity to agree or disagree with the selection by depressing certain keys.

For the initial part of the menu selection process, all

decision information and announcement data can be maintained in the local storage of the IVR service module. Once the subscriber enters the specific transaction of interest such as shopping or theater tickets, it is necessary to interface with the service provider computer. The service provider computer is on-line via MODEM or WAN connections with all of the individual vendors/shopping tenants and financial institutions. For example, seating information data, required for best available seats for a particular performance, is accessed using the ticket distribution software in the main CPU which is designed to interface seamlessly with a ticket distribution computer system where the specific seating data is maintained. The ticket distribution computer may be on-line with numerous other ticketing organizations, such as those that operate out of a shopping mall, or that have a human attendant telephone service. The telephone system of the present invention simply represents another form of ticket outlet. It should be noted that for ticket charges, the ticket distributor can process the financial charge verification and money collection.

The service provider computer maintains software for each vendor/tenant and financial service function, and utilizes that software in accordance with the choices made by the subscriber. That software will either interface back directly with the IVR service module, or will act as a data conduit or router between the IVR service module and the vendor/tenant's computer system.

With regard to the PIN and account verification functions, the DTMF tones are used to transmit data from the subscriber, and then transfer the resulting information to the service provider computer for account verification. Once the account is verified, the system continues with the menu selection process.

As can be seen in Figure 2A, the telephone terminal can include the same dual processor controller as the IVR service module. The second CODEC is used to support a speaker phone function. All of the standard telephone functions such as keypad scanning, DTMF

tone generation, on-hook/off-hook switching, speech circuits, and finger function are accomplished with this basic Z89C67 circuit. As mentioned above, the Z89C67 also has modem functionality, DTMF detection, Voice/Data detection and a powerful microcontroller capable of driving the printer and LCD display.

The telephone system can further comprise a portable electronic security key issued to each subscriber of the telephone system, and a corresponding key reader mounted on each telephone terminal. The primary purpose of the security key is to prevent unauthorized use of the telephone systems. In particular, the security key contains an electronic non-volatile memory and a pre-written electronic personal ID code as well as several other encrypting numbers which had previously been written into the key memory. These codes are maintained in a customer data file in the service provider computer. When transmitted from the telephone terminal to the central computer, the personal ID code is encrypted with the subscriber's PIN data and a special transmission authorization code, which together define a unique number. Even if someone were to monitor the subscriber's phone line, they would not be able to decipher all of the variables in the number and thereby illegally use a subscriber's PIN to order merchandise, tickets or services. In like manner, when a ticket is printed, an authorization code is sent, which is encrypted with the security key data and the subscriber's PIN to create a totally unique number known only by the service provider computer. Since the telephone terminal has access to the encryption code, the telephone terminal is able to receive the encrypted authorization number and recreate the authorization number for validation purposes.

A preferred method of using the telephone system and security key arrangement will now be described.

Initially, the central computer requests that the subscriber enter his/her PIN number via the keypad of the telephone terminal. As the subscriber enters the PIN number, that number is transmitted to the

central computer using DTMF data transmission techniques.

As previously noted, the initial diagnostic check of the telephone terminal had provided to the central computer the model number of the telephone terminal currently being used. Therefore, the computer already knows whether that terminal is equipped with a security key reader. If it is, the central computer next requests that the telephone terminal echo back the data continuing that request, but in an encrypted format based on the encryption code contained in the ID portion of the memory of the security key. This sequence positively identifies the user as having a valid security key which matches the PIN number which was initially entered.

Thereafter, if a purchase is to be made using the subscriber's credit card number and information relating thereto, that information and credit card number are requested and are then transmitted by the terminal using a separate financial encryption code contained in a second location in the memory of the security key. By operating the telephone system in this manner, persons monitoring the telephone call are prevented from deciphering the credit card number of the information relating thereto.

In addition, when tickets are printed, a third encryption code is used to encrypt an authorization code sent with each ticket. The reason for using multiple encryption codes is to add extra levels of security. The encryption code is never transmitted over the telephone lines, and therefore cannot be deciphered. However, because the ticket issuing computer does have access to the subscriber's encryption code, as well as the authorization code, it is able to recreate the authorization number for validation purposes.

Since the security key is portable, it can be used with any phone terminal equipped with a key reader, while still identifying the actual subscriber/user. This is an additional important benefit of the security key in its preferred embodiment. Suitable keys and key readers are known in the art. For example, the key may be

Model DK1000 and the reader may be Model KC4210, both from Datakey, Inc., 407 West Travelers Trail, Burnsville, MN 55337. Another suitable key is Model LCS 1000 from the same company.

Since these components are entirely conventional, they are not illustrated in detail in the drawings. However, in Fig. 2A they are represented in block form and in Figures 3,4 and 5 the opening through which the key is inserted into the key reader is designated by reference numeral 270.

With reference to Figure 3, the telephone terminal can include a housing 210 having a cover 220 for the printer's paper 221; a paper exit 230, a volume control 240; a speakerphone speaker 250; a keypad 260; a relatively small LCD display 38'; and a security key reader opening 270. Included in the keypad 260 are several function keys F1, F2 for "fastdialing" the central computer, several conventional telephone keys, and at least two scrolling keys 280 for scrolling the LCD display 38'. Also illustrated is a star cursor 290 which denotes a selected one or ones of the displayed items.

Alternatively, with reference to Figures 4 and 5, the telephone terminal can comprise a housing 210' having a cover 220 for the printer's paper; a paper exit 230; a volume control 240; a speakerphone speaker 250; a keypad 260'; a relatively large LCD display screen 38"; and a security key reader opening 270. Included in the keypad 260' are keys for "fastdialing" the central computer; conventional telephone keys 281; keys 280' for controlling movement of a cursor on the display screen 38"; keys 282 for adjusting the intensity of the display screen 38"; and several additional function keys 283. By using an LCD screen 38", it is possible to provide seating diagrams by way of the display. Preferably, the screen 38" is pivotally mounted on the telephone terminal so that it can be collapsed flat against the top of the telephone terminal when not in use (as illustrated in Figure 5).

Similarly, with reference to Figure 6, the present invention

can be practiced along with a cable television interactive converter box printer 300 (CTICBP) which can also print receipts, tickets, coupons, etc. Interactive television provides the subscriber with the ability to interact with images displayed on a television in order to cause a desired result. Currently, interactive television systems are being used to order and play games, order pay-per-view movies, purchase items and services, and now with the addition of Applicant's integrated printer and support infrastructure, interactive television can be used to printout tickets, receipts, coupons, bank balances, or stock quotes.

The CATV interactive cable box is an electronic device which is installed in a subscriber's residence or office, and is connected to a television set therein. In particular, the box is used to communicate with transmission equipment located at the cable station's headend, and to convert CATV transmitted broadband signals into signals suitable for display on conventional television sets. Interactive converter boxes are predominately comprised of digital circuitry thereby allowing a natural interface to a printer device.

The CTICBP 300 uses the same type of printer mechanism 310 as is contemplated for the present invention. The CTICBP 300 is connected using cable plant, wireless, satellite, or phone line using either twisted pair or fiber, communications to the transmission facility's headend equipment. The service provider for operating the central computer of the present invention and hence providing various services can either be affiliated with the cable television station or can be independent thereof. All transactions can be menu driven from information displayed on the subscribers television. A remote control device (not illustrated) is used to generate the responses to the menu inquiries. When the initial connection is made with the service provider, status information, model number and revision number are transmitted back to the central computer. Since the central computer is aware that it is communicating with an interactive television converter box, it sends data formatted for that particular device. When

ordering tickets, a full screen display of available seats for the desired performance or event therefore can be provided and updated immediately. There can also be an zoom feature and multicolor display of information that allows accurate visualization of proposed seating.

The preferred embodiment of the CTICBP 300 illustrated in Figure 6 includes a housing 305, a printer 310, a power button 315, a display 320, a sensor 325 for receiving messages from a remote control device, and a CD-ROM memory 330.

While the present invention has been described with reference to several preferred embodiments, it is understood that the invention is not limited to these embodiments. Various modifications within the scope of the present invention, will become subsequently apparent to those have ordinary skill in the art. Combining two or more of the foregoing devices, for example, into a single device such as an instruction announcer, answering machine and tone sensor in one device, is well within the scope of the present invention. It is further understood that the main processor may be constructed and programmed to perform the functions of some of the foregoing devices. In this regard, the main processor may include, by virtue of its construction and programming, a tone sensor, account number receiving device, PIN verification device, a memory device, etc. Accordingly, it is further understood that the scope of the present invention is not limited by the illustrated embodiments, but rather is limited only by the scope of the appended claims.

We claim:

1. A telephone system for ordering different types of tickets or coupons, said telephone system comprising:

at least one telephone terminal for linking a subscriber of the telephone system, said at least one telephone terminal comprising a microprocessor, a telephone having a keypad, a data modem, and a printer for printing ticket indicia, said printer being connected and responsive to said data modem and said microprocessor; and

a central computer linked by telephone lines to said at least one telephone terminal, said central computer comprising:

an interface device connected to said telephone lines for communicating with the data modem of said at least one telephone terminal;

an answering machine connected to said telephone lines and responsive to incoming telephone calls, for answering the incoming telephone calls with a pre-recorded message explaining to the subscriber which buttons on the keypad of the telephone terminal correspond to ticket purchase transactions the subscriber can make with the central computer;

a tone sensor connected to said telephone lines and responsive to tones generated by the telephone terminal, for detecting which keys were pressed on the keypad of the telephone terminal;

a main processor connected and responsive to said tone sensor, for processing said ticket purchase transactions according to information keyed in by the subscriber and pursuant to a predetermined protocol, and for outputting ticket purchase data to said printer via said interface device, said telephone lines, and said data modem; and

an instruction announcer connected to and controlled by said main processor, for selecting from a plurality of pre-determined instructions, the particular instruction that corresponds to a current ticket purchase transaction, and for announcing said particular instruction to the subscriber via the telephone terminal.

2. The telephone system of claim 1, wherein said central computer includes a memory device for storing data related to each ticket purchase transaction which occurs between said subscriber and the central computer.

3. The telephone system of claim 1, wherein said central computer further comprises:

an account number receiving device connected to the tone sensor, for receiving at least one financial account number from the subscriber through said telephone terminal; and

an account communications device for communicating automatically with a computer system of at least one financial institution, whereby financial account information pertaining to a financial account of the subscriber can be accessed by the central computer.

4. The telephone system of claim 3, wherein said account communications device is capable of crediting or debiting the subscriber's financial account in accordance with said ticket purchase transactions.

5. The telephone system of claim 3, wherein said central computer further comprises a PIN verification device connected and responsive to said tone sensor and also connected and responsive to said account communications device, for receiving a personal identification number from the subscriber via the telephone terminal, and for verifying the personal identification number based on said financial account information, said PIN verification device being further connected to said main processor so that the main processor can deny or grant ticket purchase transactions based on said verification of the personal identification number.

6. The telephone system of claim 1, wherein said main processor is programmed to receive an authorization number from said subscriber through said telephone terminal, verify said authorization number, and grant or deny said ticket purchase transactions based on

whether the authorization number is valid.

7. The telephone system of claim 1, wherein said central computer further comprises:

a ticket distributer interface for communicating automatically with a computer system of at least one ticket distributer, whereby information pertaining to scheduling and available seating for airline flights, sporting events, and concerts can be accessed by the central computer; and

an available seating announcer connected and responsive to said ticket distributer interface, for automatically announcing via said telephone terminal said information pertaining to scheduling and available seating, said main processor being responsive to confirmation information keyed in by the subscriber using the telephone terminal, said confirmation information being indicative of whether the subscriber wishes to purchase tickets for the event and seat currently announced by said available seating announcer.

8. The telephone system of claim 7, wherein said main processor and said microprocessor cause said printer to generate a ticket having indicia indicative of the artist performing, seat number, place of performance, and date and time of performance in the case of a concert; the teams playing, date and time of the event, and the stadium in the case of a sporting event; and the airline, the date, time and place of departure, and the airline in the case of a flight.

9. The telephone system in claim 1, wherein said central computer further comprises a bar-code generating device for generating a bar-code on each ticket purchased using the telephone system, said printer being responsive to said bar-code generating device such that a bar-code is printed on every ticket generated by the printer, said bar-codes being readable by an optical scanner in order to verify the authenticity of tickets issued by the telephone system.

10. The telephone system of claim 9, wherein said central computer includes means for communicating with at least one optical

scanner at a location where tickets from the telephone system are tendered, said means for communicating with the optical scanner providing information indicative of which bar-codes are valid so that said optical scanner can distinguish authentic tickets from fraudulent tickets.

11. The telephone system of claim 1, wherein said printer prints said ticket indicia onto an adhesive-backed material which can be subsequently attached to ticket stock material.

12. The telephone system of claim 1, wherein said at least one telephone terminal further comprises a display responsive to the microprocessor and the data modem.

13. The telephone system of claim 12, wherein said central computer further comprises:

a lottery ticket distributer interface for communicating automatically with a computer system of at least one lottery ticket distributer so that lottery tickets can be purchased using the telephone system, wherein the information keyed in by the subscriber includes desired lottery numbers, types of lottery tickets, and number of tickets, and wherein said main processor receives said information from the subscriber and causes said information to be displayed on the display of the telephone terminal prior to completing the ticket purchase transaction with the computer system of the lottery ticket distributer, said lottery ticket transaction being completed only after receiving a confirmation from the subscriber via the keypad of the telephone terminal.

14. The telephone system of claim 12, wherein said central computer further comprises a store communication device for communicating with an automated product ordering computer of a store, said main processor being programmed to receive via the keypad of the telephone terminal a product number corresponding to a particular product sold by the store, said display being responsive to the main processor and the microprocessor so as to display the product

number, the main processor being programmed to complete a purchase transaction of the product only after having received a keyed-in confirmation from the subscriber, said printer being responsive to said main processor and said microprocessor so that a receipt is printed at the telephone terminal after the purchase transaction is completed.

15. The telephone system of claim 12, wherein said main processor is programmed to receive an authorization number from said subscriber through said telephone terminal, to verify said authorization number, and to grant or deny use of the telephone system based on whether the authorization number is valid, and wherein said central computer further comprises:

a store communication device for communicating with an automated product ordering computer of a store, said main processor being programmed to receive via the keypad of the telephone terminal a product number corresponding to a particular product sold by the store, said display being responsive to the main processor and the microprocessor so as to display the product number, the main processor being programmed to complete a product purchase transaction of the product only after having received a keyed-in confirmation from the subscriber, said printer being responsive to said main processor and said microprocessor so that a receipt is printed at the telephone terminal after the product purchase transaction is completed;

an account number receiving device connected to the tone sensor, for receiving at least one financial account number from the subscriber through said telephone terminal;

an account communications device for communicating automatically with a computer system of at least one financial institution, whereby financial account information pertaining to a financial account of the subscriber can be accessed by the central computer, said account communications device being capable of crediting or debiting the subscriber's financial account in accordance

with said ticket purchase transactions and said product purchase transactions;

a PIN verification device connected and responsive to said tone sensor and also connected and responsive to said account communications device, for receiving a personal identification number from the subscriber via the telephone terminal, and for verifying the personal identification number based on said financial account information, said PIN verification device being further connected to said main processor so that the main processor can deny or grant ticket purchase transactions and product purchase transactions based on said verification of the personal identification number;

a ticket distributer interface for communicating automatically with a computer system of at least one ticket distributer, whereby information pertaining to scheduling and available seating for airline flights, sporting events, and concerts can be accessed by the central computer;

an available seating announcer connected and responsive to said ticket distributer interface, for automatically announcing via said telephone terminal said information pertaining to scheduling and available seating, said main processor being responsive to confirmation information keyed in by the subscriber using the telephone terminal, said confirmation information being indicative of whether the subscriber wishes to purchase tickets for the event and seat currently announced by said available seating announcer, said printer being responsive to said main processor and said microprocessor so as to generate a ticket having indicia indicative of the artist performing, seat number, place of performance, and date and time of performance in the case of a concert; the teams playing, date and time of the event, and the stadium in the case of a sporting event; and the airline, the date, time and place of departure, and the airline in the case of a flight;

a bar-code generating device for generating a bar-code on each ticket purchased using the telephone system, said printer being

responsive to said bar-code generating device such that a bar-code is printed on every ticket generated by the printer, said bar-codes being readable by an optical scanner in order to verify the authenticity of tickets issued by the telephone system;

means for communicating with at least one optical scanner at a location where tickets from the telephone system are tendered, said means for communicating with the optical scanner providing information indicative of which bar-codes are valid so that said optical scanner can distinguish authentic tickets from fraudulent tickets; and

a lottery ticket distributer interface for communicating automatically with a computer system of at least one lottery ticket distributer so that lottery tickets can be purchased using the telephone system, wherein the information keyed in by the subscriber includes lottery ticket information such as desired lottery numbers, types of lottery tickets, and number of tickets, and wherein said main processor receives said lottery ticket information from the subscriber and causes said information to be displayed on the display of the telephone terminal prior to completing the ticket purchase transaction with the computer system of the lottery ticket distributer, said ticket purchase transaction being completed only after receiving a confirmation from the subscriber via the keypad of the telephone terminal.

16. The telephone system of claim 14, wherein said microprocessor is programmed to perform a diagnostic check of the internal components of the telephone terminal, and to automatically transmit to the central computer a number indicative of a model number of the telephone terminal, a revision number corresponding to a most recent programming of the microprocessor, and an indication of the outcome of the diagnostic check.

17. The telephone system of claim 14, wherein said printer prints said ticket indicia onto an adhesive-backed material which can be subsequently attached to ticket stock material.

18. The telephone system of claim 12, wherein said display is a liquid crystal display.

19. The telephone system of claim 12, wherein said display is a liquid crystal display screen pivotally mounted to said at least one telephone terminal, such that said liquid crystal display screen can be collapsed flat against said at least one telephone terminal when not in use.

20. The telephone system of claim 1, and further comprising a cable television interactive converter box connected to at least one telephone terminal and also connected to a television screen, for displaying information on said television screen which relates to a ticket purchase transaction, said cable television interactive converter box having remote control means for providing said telephone terminal with information keyed in by the subscriber pursuant to said predetermined protocol.

21. The telephone system of claim 20, wherein said cable television interactive converter box further comprises a second printer for printing ticket indicia.

22. The telephone system of claim 1, and further comprising an electronic security key for each subscriber having encrypted security data stored in an internal memory thereof; and security key reader mounted on said at least one telephone terminal, for reading said encrypted security data from said security key and transmitting said encrypted security data to said central computer for verification purposes.

23. A ticket ordering system for ordering different types of tickets, comprising:

at least one cable television interactive converter box connected to a television screen, for linking a subscriber to the ticket ordering system, said at least on cable television interactive converter box comprising a printer for printing ticket indicia and a remote control unit for inputting data from the subscriber; and

a central computer linked to said at least one cable television interactive converter box, said central computer comprising:

an instruction processor connected and responsive to said at least one cable television interactive converter box, for receiving commands from a subscriber and responding with data containing a message explaining to the subscriber which buttons on the remote control unit correspond to ticket purchase transaction the subscriber can make with the central computer, for selecting from a plurality of pre-determined instructions the particular instruction that corresponds to a current ticket purchase transaction, and for outputting said particular instruction to the subscriber via said at least one cable television interactive converter box and the television screen connected thereto;

a main processor connected and responsive to said at least one cable television interactive converter box, for processing said ticket purchase transactions according to information keyed in by the subscriber and pursuant to a predetermined protocol, and for outputting ticket purchase data to said printer.

24. A telephone system for ordering different types of tickets or coupons, said telephone system comprising:

at least one telephone terminal for linking a subscriber of the telephone system to the telephone system, said at least one telephone terminal comprising a microprocessor, a telephone having a keypad, a data modem, and a printer for printing ticket indicia, said printer being connected and responsive to said data modem and said microprocessor;

a central computer linked by telephone lines to said at least one telephone terminal, said central computer comprising:

an interface device connected to said telephone lines for communicating with the data modem of said at least one telephone terminal;

an answering machine connected to said telephone lines

and responsive to incoming telephone calls, for answering the incoming telephone calls with a pre-recorded message explaining to the subscriber which buttons on the keypad of the telephone terminal correspond to ticket purchase transactions the subscriber can make with the central computer;

a tone sensor connected to said telephone lines and responsive to tones generated by the telephone terminal, for detecting which keys were pressed on the keypad of the telephone terminal;

a main processor connected and responsive to said tone sensor, for processing said ticket purchase transactions according to information keyed in by the subscriber and pursuant to a predetermined protocol, and for outputting ticket purchase data to said printer via said interface device, said telephone lines, and said data modem;

an instruction announcer connected to and controlled by said main processor, for selecting from a plurality of pre-determined instructions, the particular instruction that corresponds to a current ticket purchase transaction, and for announcing said particular instruction to the subscriber via the telephone terminal; and

wherein said printer prints said ticket indicia onto an adhesive-backed material which can be subsequently attached to ticket stock material.

25. A telephone system for ordering different types of tickets or coupons, said telephone system comprising:

at least one telephone terminal for linking a subscriber of the telephone system to the telephone system, said at least one telephone terminal comprising a microprocessor, a telephone having a keypad, a data modem, and a printer for printing ticket indicia, said printer being connected and responsive to said data modem and said microprocessor; and

a central computer linked by telephone lines to said at least one telephone terminal, said central computer comprising:

an interface device connected to said telephone lines for

communicating with the data modem of said at least one telephone terminal;

an answering machine connected to said telephone lines and responsive to incoming telephone calls, for answering the incoming telephone calls with a pre-recorded message explaining to the subscriber which buttons on the keypad of the telephone terminal correspond to ticket purchase transactions the subscriber can make with the central computer;

a tone sensor connected to said telephone lines and responsive to tones generated by the telephone terminal, for detecting which keys were pressed on the keypad of the telephone terminal;

a main processor connected and responsive to said tone sensor, for processing said ticket purchase transactions according to information keyed in by the subscriber and pursuant to a predetermined protocol, and for outputting ticket purchase data to said printer via said interface device, said telephone lines, and said data modem;

an instruction announcer connected to and controlled by said main processor, for selecting from a plurality of pre-determined instructions, the particular instruction that corresponds to a current ticket purchase transaction, and for announcing said particular instruction to the subscriber via the telephone terminal;

said at least one telephone terminal further comprising a display responsive to the microprocessor and the data modem;

said central computer further comprising a store communication device for communicating with an automated product ordering computer of a store, said main processor being programmed to receive via the keypad of the telephone terminal a product number corresponding to a particular product sold by the store, said display being responsive to the main processor and the microprocessor so as to display the product number, the main processor being programmed to complete a purchase transaction of the product only after having received a keyed-in confirmation from the subscriber, said printer being

responsive to said main processor and said microprocessor so that a receipt is printed at the telephone terminal after the purchase transaction is completed; and

wherein said printer prints said ticket indicia onto an adhesive-backed material which can be subsequently attached to ticket stock material.

26. A telephone system for ordering different types of tickets or coupons, said telephone system comprising:

at least one telephone terminal for linking a subscriber of the telephone system to the telephone system, said at least one telephone terminal comprising a microprocessor, a telephone having a keypad, a data modem, and a printer for printing ticket indicia, said printer being connected and responsive to said data modem and said microprocessor; and

a central computer linked by telephone lines to said at least one telephone terminal, said central computer comprising:

an interface device connected to said telephone lines for communicating with the data modem of said at least one telephone terminal;

an answering machine connected to said telephone lines and responsive to incoming telephone calls, for answering the incoming telephone calls with a pre-recorded message explaining to the subscriber which buttons on the keypad of the telephone terminal correspond to ticket purchase transactions the subscriber can make with the central computer;

a tone sensor connected to said telephone lines and responsive to tones generated by the telephone terminal, for detecting which keys were pressed on the keypad of the telephone terminal;

a main processor connected and responsive to said tone sensor, for processing said ticket purchase transactions according to information keyed in by the subscriber and pursuant to a predetermined protocol, and for outputting ticket purchase data to said printer via said

interface device, said telephone lines, and said data modem;

an instruction announcer connected to and controlled by said main processor, for selecting from a plurality of pre-determined instructions, the particular instruction that corresponds to a current ticket purchase transaction, and for announcing said particular instruction to the subscriber via the telephone terminal;

said at least one telephone terminal further comprising a display responsive to the microprocessor and the data modem;

said central computer further comprising a store communication device for communicating with an automated product ordering computer of a store, said main processor being programmed to receive via the keypad of the telephone terminal a product number corresponding to a particular product sold by the store, said display being responsive to the main processor and the microprocessor so as to display the product number, the main processor being programmed to complete a purchase transaction of the product only after having received a keyed-in confirmation from the subscriber, said printer being responsive to said main processor and said microprocessor so that a receipt is printed at the telephone terminal after the purchase transaction is completed; and

said microprocessor being programmed to perform a diagnostic check of the internal components of the telephone terminal, and to automatically transmit to the central computer a number indicative of a model number of the telephone terminal, a revision number corresponding to a most recent programming of the microprocessor, and an indication of the outcome of the diagnostic check.

27. A telephone system for making different types of purchase transactions, said telephone system comprising:

at least one telephone terminal for linking a subscriber of the telephone system to the telephone system, said at least one telephone terminal comprising a microprocessor, a telephone having a

keypad, a data modem, and a printer for printing purchase data, said printer being connected and responsive to said data modem and said microprocessor; and

a central computer linked by telephone lines to said at least one telephone terminal, said central computer comprising:

an interface device connected to said telephone lines for communicating with the data modem of said at least one telephone terminal;

an answering machine connected to said telephone lines and responsive to incoming telephone calls, for answering the incoming telephone calls with a pre-recorded message explaining to the subscriber which buttons on the keypad of the telephone terminal correspond to purchase transactions the subscriber can make with the central computer;

a tone sensor connected to said telephone lines and responsive to tones generated by the telephone terminal, for detecting which keys were pressed on the keypad of the telephone terminal;

a main processor connected and responsive to said tone sensor, for processing said purchase transactions according to information keyed in by the subscriber and pursuant to a predetermined protocol, and for outputting purchase data to said printer via said interface device, said telephone lines, and said data modem;

an instruction announcer connected to and controlled by said main processor, for selecting from a plurality of pre-determined instructions, the particular instruction that corresponds to a current purchase transaction, and for announcing said particular instruction to the subscriber via the telephone terminal; and

a portable security key comprising non-volatile memory for storing subscriber information and adapted to transmit said information to said central computer when said key is inserted in said at least one telephone terminal.

28. The system of claim 27, wherein said at least one terminal

includes means for reading said information for transmission to said central computer.

29. The system of claim 27, comprising a plurality of said telephone terminals and wherein said portable security key is adapted to transmit said information when said key is inserted in any one of said terminals.

30. The system of claim 29, wherein each of said terminals includes means for reading said information for transmission to said central computer.

31. The system of claim 27, wherein said information includes the subscriber's personal identification code and a plurality of other encrypting numbers.

32. The system of claim 31, including means for transmitting financial information concerning the purchase transaction encrypted with at least one of said encryption numbers.

33. A telephone system for making different types of purchase transactions, said telephone system comprising:

at least one telephone terminal for linking a subscriber of the telephone system to the telephone system, said at least one telephone terminal comprising a microprocessor, a telephone having a keypad, a data modem, and a printer for printing purchase data, said printer being connected and responsive to said data modem and said microprocessor; and

a central computer linked by telephone lines to said at least one telephone terminal, said central computer comprising:

an interface device connected to said telephone lines for communicating with the data modem of said at least one telephone terminal;

an answering machine connected to said telephone lines and responsive to incoming telephone calls, for answering the incoming telephone calls with a pre-recorded message explaining to the subscriber which buttons on the keypad of the telephone terminal

correspond to purchase transactions the subscriber can make with the central computer;

a tone sensor connected to said telephone lines and responsive to tones generated by the telephone terminal, for detecting which keys were pressed on the keypad of the telephone terminal;

a main processor connected and responsive to said tone sensor, for processing said purchase transactions according to information keyed in by the subscriber and pursuant to a predetermined protocol, and for outputting purchase data to said printer via said interface device, said telephone lines, and said data modem;

an instruction announcer connected to and controlled by said main processor, for selecting from a plurality of pre-determined instructions, the particular instruction that corresponds to a current purchase transaction, and for announcing said particular instruction to the subscriber via the telephone terminal; and

means at said telephone terminal for responding to the transmission of said data from said central computer to prevent the subscriber from hearing the reception of said data.

34. The system of claim 33 wherein said hearing preventing means comprises means for transmitting from said central computer a burst of a signal of predetermined frequency at the beginning of each data transmission and means at said terminal to detect said burst and to mute the telephone of said terminal in response to said detection.

35. The system of claim 34, wherein the end of a data transmission from said central computer is denoted by a predetermined code, and said terminal includes means for responding to said code to unmute said telephone.

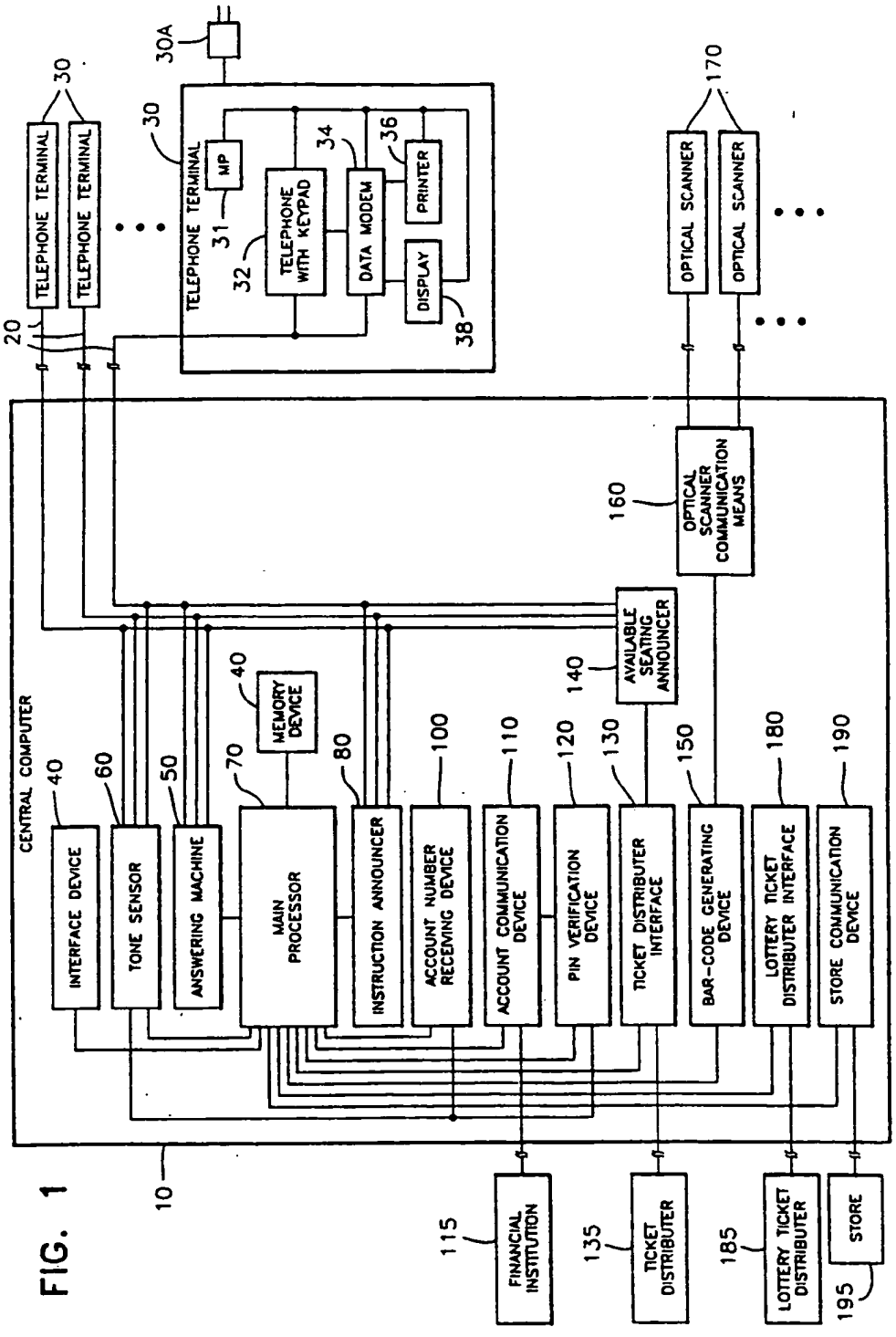

TELEPHONE TERMINAL
TELEPHONE TERMINAL
30
30A
30
TELEPHONE TERMINAL
MP
31
32
TELEPHONE WITH KEYPAD
34
DATA MODEM
36
PRINTER
DISPLAY
38
20
OPTICAL SCANNER
OPTICAL SCANNER
170
160
OPTICAL SCANNER COMMUNICATION MEANS
AVAILABLE SEATING ANNOUNCER
140
CENTRAL COMPUTER
40
MEMORY DEVICE
INTERFACE DEVICE
60
TONE SENSOR
50
ANSWERING MACHINE
70
MAIN PROCESSOR
80
INSTRUCTION ANNOUNCER
100
ACCOUNT NUMBER RECEIVING DEVICE
110
ACCOUNT COMMUNICATION DEVICE
120
PIN VERIFICATION DEVICE
130
TICKET DISTRIBUTER INTERFACE
150
BAR-CODE GENERATING DEVICE
180
LOTTERY TICKET DISTRIBUTER INTERFACE
190
STORE COMMUNICATION DEVICE
10
115
FINANCIAL INSTITUTION
135
TICKET DISTRIBUTER
185
LOTTERY TICKET DISTRIBUTER
195
STORE

FIG. 1

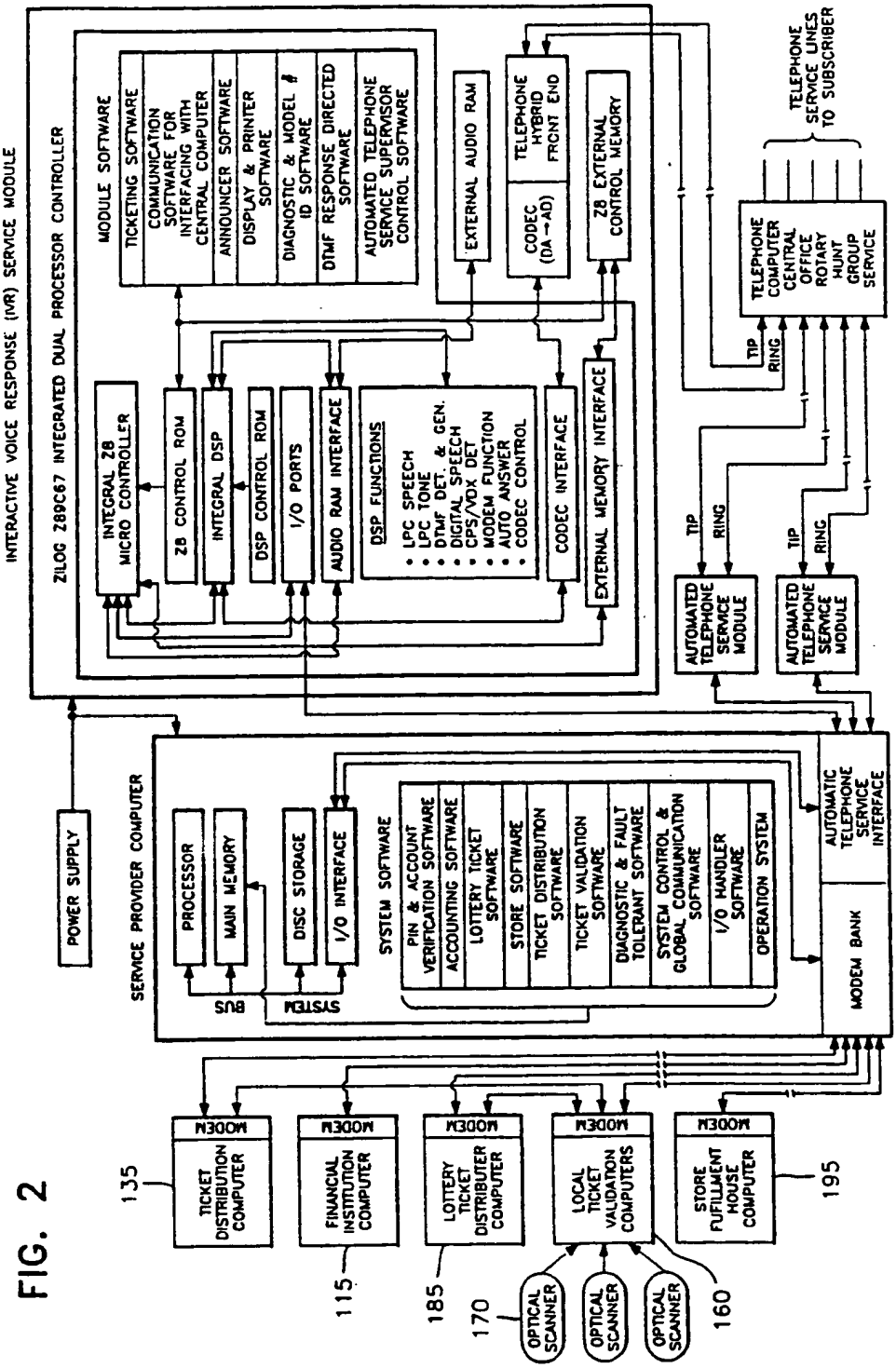

INTERACTIVE VOICE RESPONSE (IVR) SERVICE MODULE
ZILOG Z89C67 INTEGRATED DUAL PROCESSOR CONTROLLER
MODULE SOFTWARE
TICKETING SOFTWARE
COMMUNICATION SOFTWARE FOR INTERFACING WITH CENTRAL COMPUTER
ANNOUNCER SOFTWARE
DISPLAY & PRINTER SOFTWARE
DIAGNOSTIC & MODEL # ID SOFTWARE
DTMF RESPONSE DIRECTED SOFTWARE
AUTOMATED TELEPHONE SERVICE SUPERVISOR CONTROL SOFTWARE
INTEGRAL Z8 MICRO CONTROLLER
Z8 CONTROL ROM
INTEGRAL DSP
DSP CONTROL ROM
I/O PORTS
AUDIO RAM INTERFACE
DSP FUNCTIONS
• LPC SPEECH
• LPC TONE
• DTMF DET. & GEN.
• DIGITAL SPEECH
• CPS/VOX DET
• MODEM FUNCTION
• AUTO ANSWER
• CODEC CONTROL
CODEC INTERFACE
EXTERNAL MEMORY INTERFACE
EXTERNAL AUDIO RAM
CODEC (DA→AD)
TELEPHONE HYBRID FRONT END
Z8 EXTERNAL CONTROL MEMORY
TELEPHONE SERVICE LINES TO SUBSCRIBER
TELEPHONE COMPUTER CENTRAL OFFICE ROTARY HUNT GROUP SERVICE
TIP
RING
AUTOMATED TELEPHONE SERVICE MODULE
AUTOMATED TELEPHONE SERVICE MODULE
SERVICE PROVIDER COMPUTER
POWER SUPPLY
PROCESSOR
MAIN MEMORY
DISC STORAGE
I/O INTERFACE
BUS
SYSTEM
SYSTEM SOFTWARE
PIN & ACCOUNT VERIFICATION SOFTWARE
ACCOUNTING SOFTWARE
LOTTERY TICKET SOFTWARE
STORE SOFTWARE
TICKET DISTRIBUTION SOFTWARE
TICKET VALIDATION SOFTWARE
DIAGNOSTIC & FAULT TOLERANT SOFTWARE
SYSTEM CONTROL & GLOBAL COMMUNICATION SOFTWARE
I/O HANDLER SOFTWARE
OPERATION SYSTEM
AUTOMATIC TELEPHONE SERVICE INTERFACE
MODEM BANK
MODEM
TICKET DISTRIBUTION COMPUTER
135
FINANCIAL INSTITUTION COMPUTER
115
LOTTERY TICKET DISTRIBUTER COMPUTER
185
LOCAL TICKET VALIDATION COMPUTERS
170
STORE FULFILLMENT HOUSE COMPUTER
195
OPTICAL SCANNER
OPTICAL SCANNER
OPTICAL SCANNER
160

FIG. 2

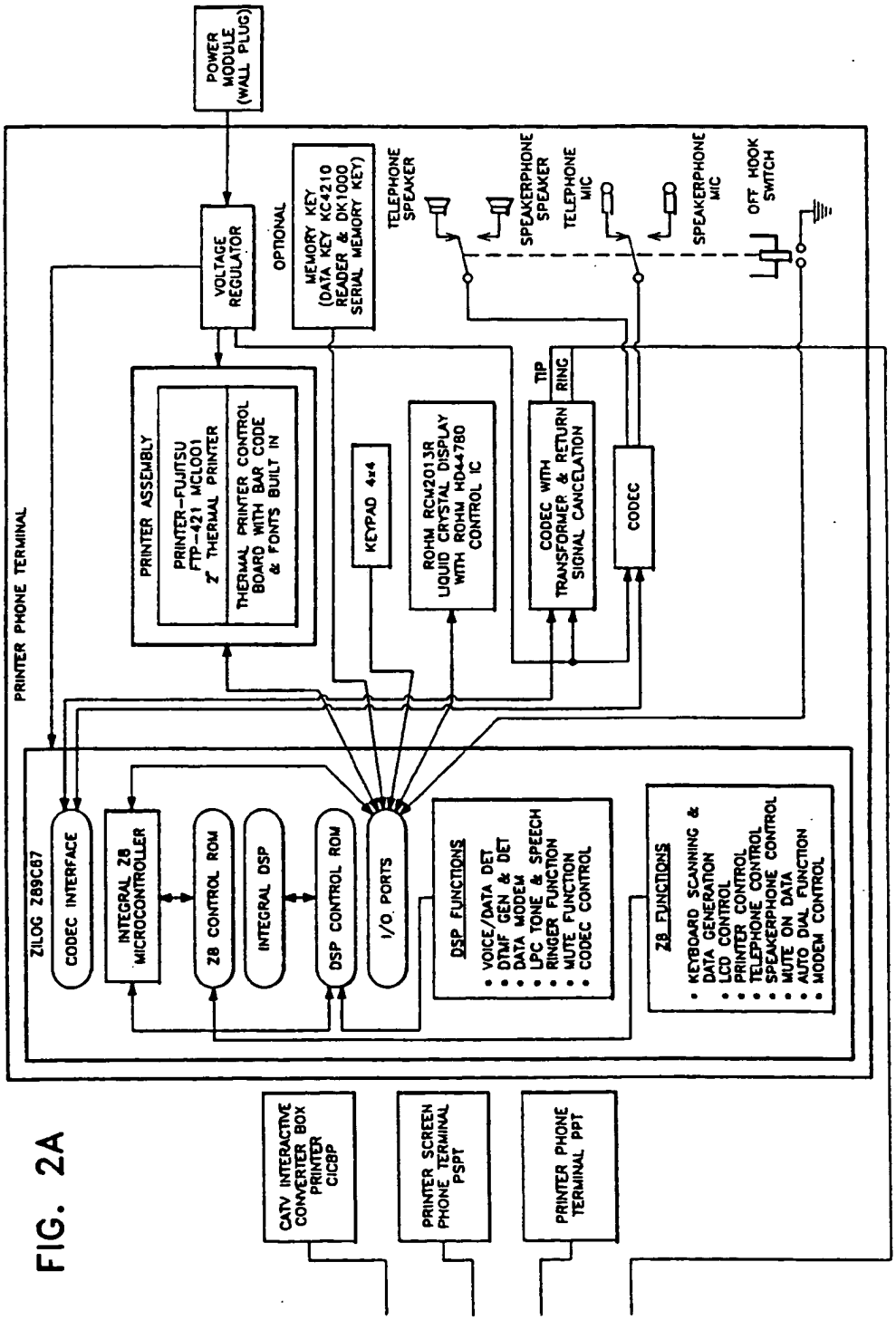

POWER MODULE (WALL PLUG)
VOLTAGE REGULATOR
OPTIONAL
MEMORY KEY (DATA KEY KC4210 READER & DK1000 SERIAL MEMORY KEY)
TELEPHONE SPEAKER
SPEAKERPHONE SPEAKER
TELEPHONE MIC
SPEAKERPHONE MIC
OFF HOOK SWITCH
PRINTER PHONE TERMINAL
PRINTER ASSEMBLY
PRINTER-FUJITSU FTP-421 MCL001 2" THERMAL PRINTER
THERMAL PRINTER CONTROL BOARD WITH BAR CODE & FONTS BUILT IN
KEYPAD 4x4
ROHM RCM2013R LIQUID CRYSTAL DISPLAY WITH ROHM HD44780 CONTROL IC
TIP
RING
CODEC WITH TRANSFORMER & RETURN SIGNAL CANCELATION
CODEC
ZILOG Z89C67
CODEC INTERFACE
INTEGRAL Z8 MICROCONTROLLER
Z8 CONTROL ROM
INTEGRAL DSP
DSP CONTROL ROM
I/O PORTS
DSP FUNCTIONS
• VOICE/DATA DET
• DTMF GEN & DET
• DATA MODEM
• LPC TONE & SPEECH
• RINGER FUNCTION
• MUTE FUNCTION
• CODEC CONTROL
Z8 FUNCTIONS
• KEYBOARD SCANNING & DATA GENERATION
• LCD CONTROL
• PRINTER CONTROL
• TELEPHONE CONTROL
• SPEAKERPHONE CONTROL
• MUTE ON DATA
• AUTO DIAL FUNCTION
• MODEM CONTROL
CATV INTERACTIVE CONVERTER BOX PRINTER CICBP
PRINTER SCREEN PHONE TERMINAL PSPT
PRINTER PHONE TERMINAL PPT

FIG. 2A

FIG. 3

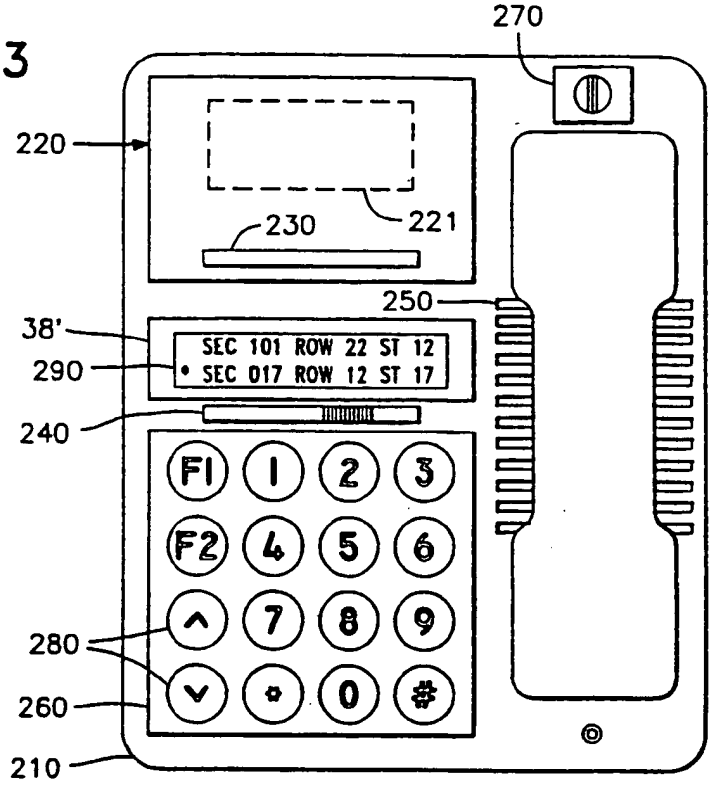

270
220
221
230
250
38'
290
SEC 101 ROW 22 ST 12
SEC 017 ROW 12 ST 17
240
F1
1
2
3
F2
4
5
6
7
8
9
280
0
#
260
210

FIG. 5

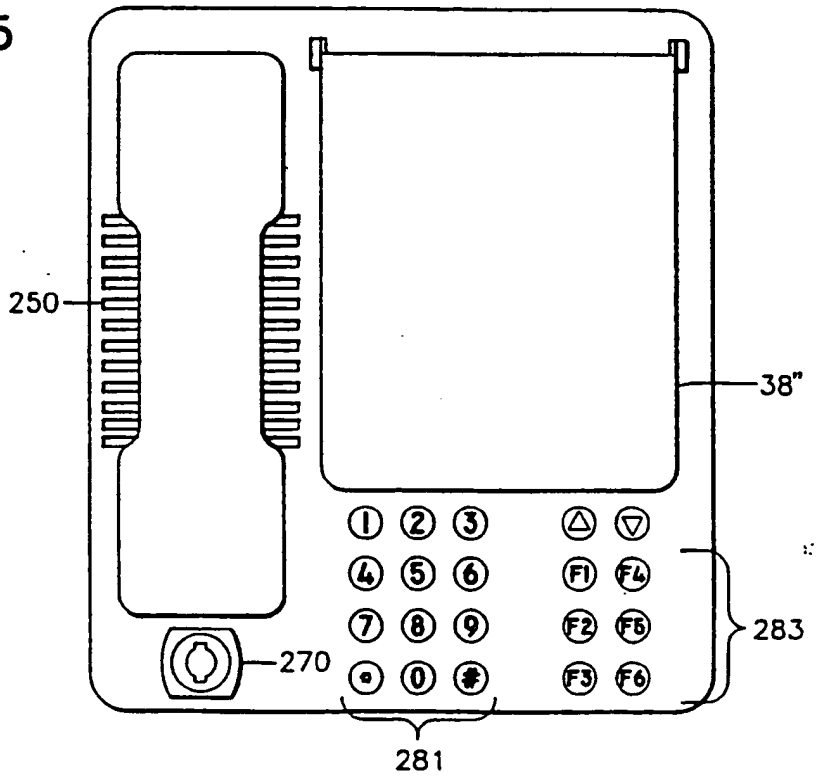

250
38"
1 2 3
4 5 6
7 8 9
0
F1 F4
F2 F5
F3 F6
283
270
281

FIG.4

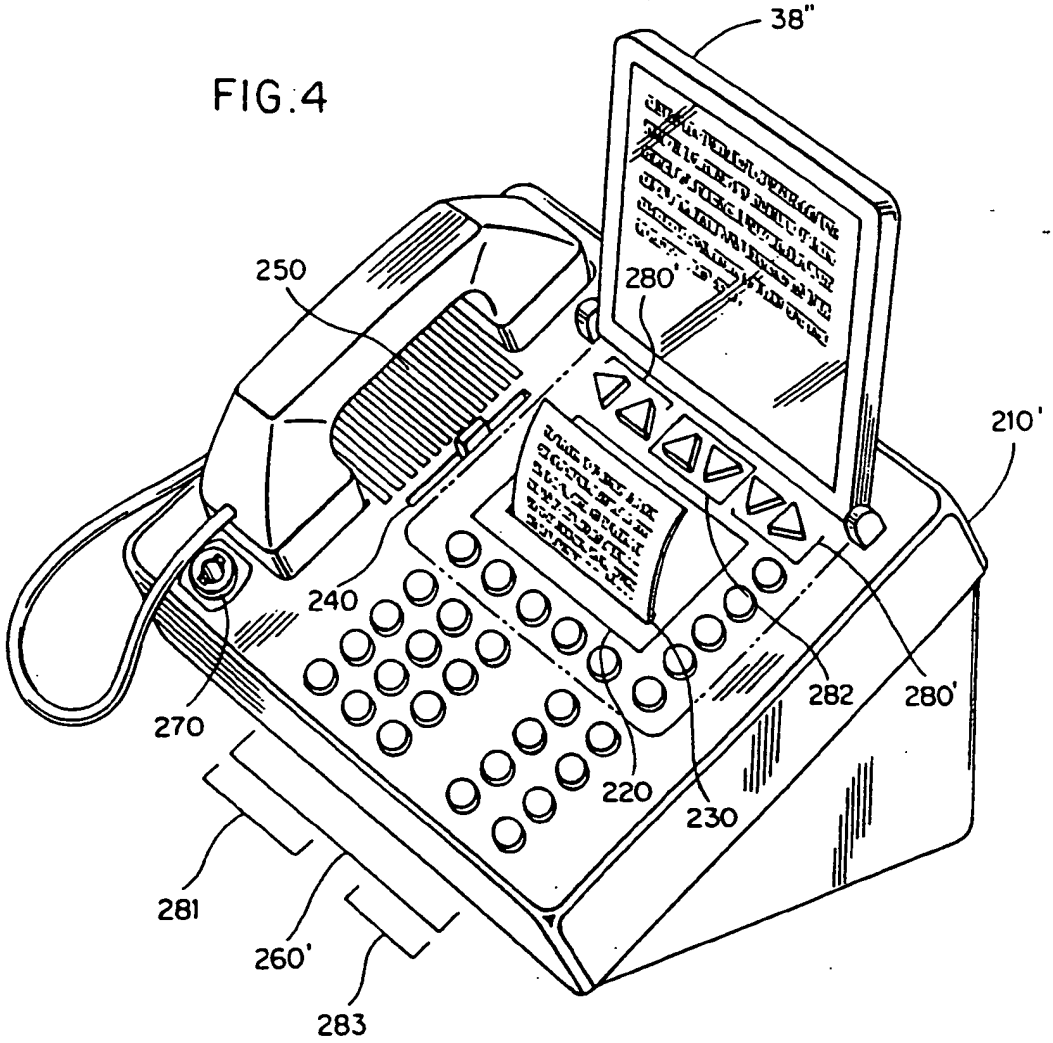
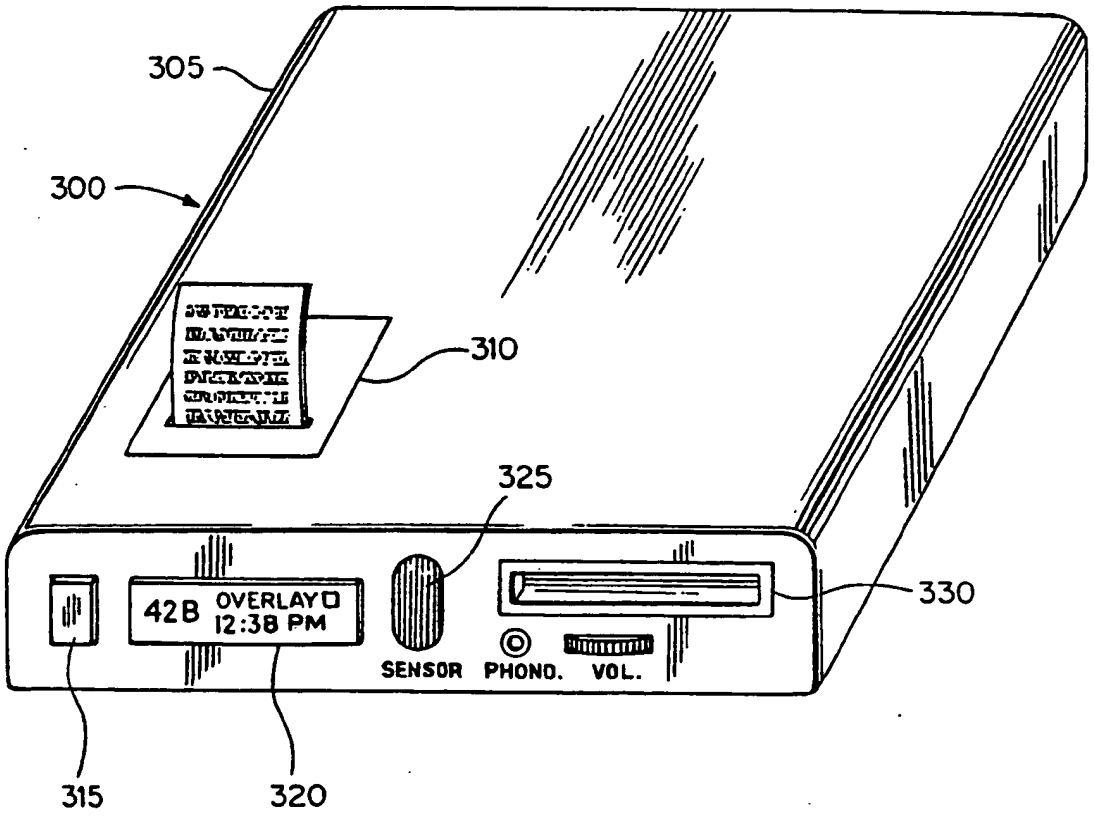


FIG. 6


305
300
310
325
330
42B OVERLAY
12:38 PM
SENSOR
PHOND.
VOL.
315
320

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US94/05379

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :G07F 07/08
US CL : 364/401, 400, 407
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 364/401, 400, 407

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	USA, 4,449,186 (Kelly et al.) 15 May 1984, col. 1, line 10 thru col. 5 line 10, and fig. 2.	1-4,6-8, 12,15-19, 21-22,27, 28,30,32, 33-35
Y	USA 5,208,665 (McCalley et al.) 04 May 1993, col. 1, lines 25-34 and col. 26 line 19 through col. 28 line 39.	1,5,14,20, 23,27,33-35
Y	USA 4,922,522 (Scanlon) 01 May 1990, col. 3, line 45 through col. 4, line 64.	13
Y,P	USA, 5,220,420 (Hoarty et al.) 15 June 1993, col. 12, lines 58-68.	9-11,15-17

[X] Further documents are listed in the continuation of Box C. [] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be part of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 12 JULY 1994	Date of mailing of the international search report OCT 13 1994
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks	Authorized officer

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US94/05379

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	USA, 4,689,610 (Dietrich) 25 August 1987, fig. 1 and col. 5, line 45 through col. 6, line 14.	27,29,31, 32